



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/043,934	01/11/2002	Thomas S. Brima	122835.8	9375

7590 11/07/2003

Robert A. Koons, Jr.  
Buchanan Ingersoll PC  
Intellectual Property Group, Eleven Penn Center  
14th Floor, 1835 Market Street  
Philadelphia, PA 19103-2785

EXAMINER

WYROZEBSKI LEE, KATARZYNA I

ART UNIT	PAPER NUMBER
----------	--------------

1714

DATE MAILED: 11/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

### Office Action Summary

Application No.

10/043,934

Applicant(s)

BRIMA ET AL.

Examiner

Katarzyna Wyrozowski Lee

Art Unit

1714

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 0102.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

***Oath/Declaration***

The oath and declaration in the present invention states, that Executrix is signing the declaration for Thomas Brim. In the supplemental, however the signature is not that of Executrix. In addition the applicants have not provided any documents, which would show legal authority for anyone to sign for Mr. Brim. Per requirements of MPEP 409.01(b) and 37 CFR 1.44, the applicants shall submit a proof of authority of the legal representative. At this point no such document has been received or recorded in the assignment.

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 8 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for self-exfoliating clay, does not reasonably provide enablement for how the clay is self-exfoliating. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to self-exfoliation the invention commensurate in scope with these claims.

In the present claim 8 the applicant state that the clay is self-exfoliating. Yet in order to exfoliate clay the applicant treats it with aminoacid and incorporate polymer into this. The mixing action, which is involved, is partly responsible for the exfoliation as well as incorporation of the intercalants. It is not clear then how the clay is self-exfoliating. In the specification the applicants further disclose that the exfoliation is result either of rapid vaporization of the solvent molecules or incorporation of molten polymer. Basically, one of ordinary skill in the art has to do something to allow silicate to exfoliated, it does not just spontaneously happen.

For more prompt prosecution of this application, the examiner will view this claims as that reading on any inorganic silicate material that can be swelled with solvent as being capable of self-exfoliation.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

4. Claims 5 and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 5 and 25 contain limitation of "substituted aminoacids". Term "substituted" renders claim indefinite, since it is not clear what the substituents are.

*Claim Rejections - 35 USC § 102*

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 8-10, 14, 15, 17, 21-22, 35, 36, 42, 43, 47, 51 are rejected under 35 U.S.C. 102(e) as being anticipated by ZHOU (US 6,617,020).

In the process of the prior art of ZHOU, a silicate such as clay having a sheet-like structure is cationically exchanged with either ammonium or phosphonium compound (col. 5, lines 13-45). The clay is then subjected to exfoliation by used of exfoliating agents (col. 6, lines 28-31). Preferred exfoliating agent is a tackifier. Upon shear mixing the clay component is exfoliated before it is added into the polymer matrix (col. 6, lines 16-27). For the process of making exfoliated clay, please see examples 1-3 in col. 14.

The exfoliated clay was then incorporated into natural rubber, which is thick liquid at room temperature and the temperature at which the mixing proceeded was in two different temperatures. One was at room temperature, and the other at 50°C then gradually increased to 105°C. The natural rubber at 50°C is a molten rubber.

Specification further teaches that the organophilic clay is stirred and dissolved in water to form exfoliated hydrophilic solution (col. 5, lines 25-30).

Other elastomers of the prior art of ZHOU include polyurethanes, polyalpha olefins, SBR, PBR, PIR (col. 3, lines 18-40). The polyolefins are homopolymers and copolymers of polypropylene (col. 4, lines 25-27).

In the light of the above disclosure, the prior art of ZHOU anticipates requirements of claims rejected above.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 2, 3, 18, 23, 28, 29, 33, 37, 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over ZHOU (US 6,617,020) in view of ELSPASS (US 6,034,164).

The discussion of the disclosure of the prior art of ZHOU from paragraph 6 of this office action is incorporated here by reference.

The difference between the present invention and the prior art of ZHOU is disclosure of solvents other than water and recitation of hydrotalcite, which is functionally equivalent to layered silicates of ZHOU.

With respect to the above difference, the prior art of ELSPASS discloses composition for rubber nanocomposite.

The silicate utilized in the composition of ELSPASS is in addition to clay also a hydrotalcite. Hydrotalcite just as well as other silicates is a layered silicate and therefore can be utilized just as equally (col. 3, lines 10-20). Using hydrotalcite will also result in cation exchange and increase of basal spacing when subjected to the same conditions as the clay of ZHOU.

The solvent utilized in the composition of ELSPASS include in addition to water alcohols (col. 3, line 25-26).

Using hydrotalcite will also result in cation exchange and increase of basal spacing when subjected to the same conditions as the clay of ZHOU. Modifying the hydrotalcites in alcohol or mixture of alcohol with water will also swell the silicate as these solvents will equally incorporate themselves in between the platelets.

In the light of the above disclosure, it would have been obvious to one having ordinary skill in the art at the time of the instant invention to utilize the hydrotalcites and alcohols of ELSPASS in the process of ZHOU and thereby arrive at the present invention. Using hydrotalcite will also result in cation exchange and increase of basal spacing when subjected to the same conditions as the clay of ZHOU. Modifying the hydrotalcites in alcohol or mixture of alcohol with water will also swell the silicate as these solvents will equally incorporate themselves in between the platelets.

11. Claims 4-7, 19, 20, 24-27, 34, 38-41, 49, 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over ZHOU (US 6,617,020) in view of ELSPASS (US 6,034,164) as applied to claims 1-3, 8-10, 14, 15, 17, 18, 21-23, 28, 29, 33, 25-37, 42, 43, 47, 48 and 51 above, and further in view of KAWASUMI (US 4,810,734).

The discussion of the disclosure of the prior art of ZHOU and ELSPASS from paragraphs 6 and 10 of this office action are incorporated here by reference.

The difference between the present invention and the disclosure of the prior art of ZHOU and ELSPASS is further recitation of solvents and swelling agents capable of intercalation and eventual exfoliation of the inorganic silicate.



With respect to the above differences, the prior art of KAWASUMI discloses another nanocomposite composition, which comprises exfoliated clay in polymer matrix.

The silicate of KAWASUMI is clay capable of swelling, intercalation, exfoliation and cation exchange (col. 3, lines 8-15).

The swelling agent incorporated into the silicate component includes aminobutyric acid ion and aminocaproic acid ion (col. 3, lines 55-64). These aminoacids have to be in ionic form in order to undergo cation exchange and efficiently modify and bond to the surface of the silicate.

The modification of the silicate is conducted in presence of solvents, which include water, alcohols such as methanol, ethanol or propanol and ketones such as methylethyl ketone or acetone (col. 4, lines 20-30). All these solvents will act in the same manner when mixed with inorganic silicate.

Use of aminoacids and solvents of KAWASUMI in the composition of ZHOU and ELSPASS will also provide expanded silicate, which will in turn when subjected to the treatment of ZHOU provide exfoliated platelets.

In the light of the above disclosure, it would have been obvious to one having ordinary skill in the art at the time of the instant invention to utilize the swelling agents and solvents of KAWASUMI in the process of ZHOU with hydrotalcite of ELSPASS and thereby arrive at the present invention.

Use of aminoacids and solvents of KAWASUMI in the composition of ZHOU and ELSPASS will also provide expanded silicate, which will in turn when subjected to the treatment of ZHOU provide exfoliated platelets.

12. Claims 11-13, 16, 30-32, 44-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over ZHOU (US 6,617,020) in view of ELSPASS (US 6,034,164) as applied to claims 1-3, 8-10, 14, 15, 17, 18, 21-23, 28, 29, 33, 25-37, 42, 43, 47, 48 and 51 above, and further in view of INOUE (EP 807,659).

The discussion of the disclosure of the prior art of ZHOU and ELSPASS from paragraphs 6 and 10 of this office action is incorporated here by reference.

The difference between the present invention and the disclosure of the prior art of ZHOU and ELSPASS is recitation of modified polypropylene and advantages of using such polypropylene and well as recitation of paste.

With respect to the above differences, the prior art of INOUE discloses making polypropylene nanocomposites, wherein the polypropylene is modified.

According to the examples of INOUE, the monomers utilized to modify the polypropylene include glycidyl methacrylate (page 100 and maleic anhydride).

The reason for the modifying polypropylene resin, it its increased reactivity with the silicate components, since now the polypropylene has functional groups (page 2, lines 30-42).

The silicate of INOUE is modified with ammonium compound. The ammonium compounds are surfactants, which in case of INOUE the long-chain salts are oils. Since no solvent is utilized, then the mixture of oily salt and silicate will form a thick paste instead of dispersion. At the end, the cation exchange is still said to happen.

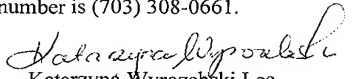
Utilizing paste instead of slurry will still afford cationic exchange between swelling agent and silicate and use of modified polypropylene affords better reaction between the silicate and polymer matrix.

In the light of the above disclosure, it would have been obvious to one having ordinary skill in the art at the time of the instant invention to utilize the modified polypropylene of INOUE instead of polypropylene of ZHOU and thereby obtain the claimed invention. Modifying polypropylene will result in better interactions between silicate and the polymer, since polypropylene contains reactive functionality.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katarzyna Wyrozebski Lee whose telephone number is (703) 306-5875. The examiner can normally be reached on Mon-Thurs 6:30 AM-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (703) 306-2777. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

  
Katarzyna Wyrozebski Lee  
Primary Examiner  
Art Unit 1714

October 9, 2003